

Successful server consolidation: it's all in the preparation

white paper, 2nd Edition



Abstract.....	3
Introduction.....	3
IT consolidation defined.....	3
The IT journey.....	3
Collocation.....	3
Hardware/data integration.....	4
Application integration.....	4
IT utility.....	4
Server consolidation as part of IT consolidation.....	4
Types of server consolidation.....	5
Customer perception.....	5
Business drivers.....	6
Financial.....	6
Operational.....	6
Strategic.....	6
Business objectives.....	7
Financial.....	7
Operational.....	7
Strategic.....	7
Consolidation considerations.....	7
Performing an analysis for server consolidation candidacy.....	8
Introducing AOG.....	8
IT consolidation opportunities.....	8
Streamlining the infrastructure.....	9
Centralization.....	9
Remote management.....	9
Reduction in operating systems.....	9
Partitioning software.....	9
Virtual servers.....	10
Rapid deployment.....	11
ProLiant Essentials Performance Management Pack.....	11
Storage.....	11
More efficient hardware.....	12

Maximizing resources.....	13
Consolidation economics.....	14
Cost savings.....	14
Power consumption.....	14
Increased server to engineer ratio.....	14
Service level agreements and server licenses	14
Real estate.....	14
Idle resources.....	15
Total cost of ownership	15
Payback.....	15
Return on investment.....	15
Economics versus technology.....	15
Common customer scenarios	16
Providing in-house IT services.....	16
Outsourcing costs.....	16
Supporting mission-critical applications.....	17
Reducing Microsoft based IT costs and lowering capital expenditures.....	17
Conclusion.....	18
For more information.....	19
Call to action	19

Abstract

The purpose of this white paper is to help IT professionals prepare for a successful IT consolidation initiative, highlighting the needs for consolidating server environments. The paper addresses the key areas of impact and the factors that need to be considered before exploring consolidation options. The economics of consolidation are discussed, including cost savings and cost avoidance that can be achieved through consolidation of the IT environment.

Introduction

Today's IT environment is unique. Budgets remain flat, business units now hold IT departments accountable for services provided, and businesses demand less downtime and increased productivity. In short, the expectation is to do more with less. This has driven the need for IT consolidation as a way to streamline the IT infrastructure and to help IT departments achieve this goal expectation.

IT departments are unable to implement a server consolidation effort without showing economic justification first. While a server consolidation effort provides IT departments many operational and strategic advantages, often the most important aspect of a successful consolidation is the financial value. This paper highlights the technological advantages of server consolidation and the potential positive financial impact on the IT environment.

IT consolidation defined

IT consolidation helps corporations build an adaptive IT infrastructure. The goal of IT consolidation is to make optimal use of available computing resources, while maintaining an infrastructure that is lower in costs, easier to manage, and secure. IT consolidation introduces a number of benefits to the current IT infrastructure.

- Automated management tools give IT professionals the ability to deploy systems faster and easily manage them remotely.
- Centralizing data centers and collocating equipment allow fewer staff members to efficiently manage more servers.
- Storage can be consolidated economically so that each server and application has access to a greater amount of storage.
- The ability to run more than one application on a single server or a set of clustered servers and the ability to deploy servers that offer better performance in a smaller form factor are now available.
- The dynamic allocation of resources and the ability of the IT infrastructure to respond quickly to changing data-center demands with a point and click is a reality.

The IT journey

The process of IT consolidation can be looked at as a journey, with many different entry points across multiple parts of an IT infrastructure. Where a business decides to enter this journey depends on the integration of the current infrastructure and business objectives. The journey can be looked at as a five part process described in the following paragraphs.

Collocation

Collocating servers into one central location is an important part of a server consolidation. Benefits of hardware relocation include immediate cost savings on server management and operation. A collocated IT environment also benefits from better physical security, availability, and system usage.

Hardware/data integration

Reducing the volume of servers and centralizing storage allows IT professionals to optimize their IT environment more. Hardware/data integration also lowers operating costs while improving performance and maximizing the availability of applications and data.

Application integration

With application integration, an IT environment shifts from multiple applications accessing multiple databases to solutions running on fewer servers that integrate databases and applications. The IT infrastructure is streamlined allowing for applications and systems to be standardized leading to an increase performance while reducing total cost of ownership.

IT utility

IT utility is the ultimate agile, adaptive infrastructure, with components that self-configure in the most economic way. Resources can be dynamically allocated to increase server and storage utilization. Changing IT needs can be responded to rapidly allowing for business transformation when necessary. Efficient, cost-effective, and highly available, this is the absolute optimal consolidated IT environment.

IT consolidation optimizes people, processes, and systems to be more efficient and effective. A successful IT consolidation initiative usually has a combination of both server and storage consolidation. Storage consolidation will be discussed briefly later in this white paper. Server consolidation is a driving force of IT consolidation because it provides the technological foundation that supports a truly adaptive IT environment. Therefore it is essential to dedicate this entire white paper to the key considerations for IT professionals when considering a server consolidation initiative.

Server consolidation as part of IT consolidation

Server consolidation is an important part of IT consolidation. Today's servers consistently deliver increased reliability and processing power. The technological capabilities of servers present new options for IT managers. Large servers with multiple processors for mission-critical applications and smaller servers designed to utilize space more efficiently can help IT managers streamline their infrastructure.

Windows Server 2003 is a server operating system designed to build upon the advanced features of Windows 2000 Server and helps organizations reduce the cost and complexity of the IT infrastructure. Windows Server 2003 provides technical advances like the Windows Resource Manager, which allows administrators to set processor and memory resource usage on applications and manage them through Group Policy settings. Other technical improvements to help improve server efficiency include support for Non-Uniform Memory Access (NUMA), Intel Hyper-Threading technology, and multi-path input/output (I/O). Windows Server 2003 also includes the .NET Framework within the product. Using the .NET Framework, developers can build and deploy XML Web services with the Windows platform. More importantly, Windows Server 2003 has been designed to coexist in the same environment as the Windows 2000 operating system. This will provide for a smooth migration for IT environments already using, or in the process of deploying, Windows 2000 Server.

A successful server consolidation initiative, as part of IT consolidation, will result in tangible financial, operational and strategic benefits while making the IT environment more efficient and easier to manage.

Types of server consolidation

IDC¹ defines the five main types of server consolidation initiatives as the following:

- **Centralization:** collocating servers and/or storage into fewer locations or one central location
- **Physical:** consolidating servers or storage systems with the same application types or platforms onto fewer or larger systems with the same application type or platform
- **Data Integration:** combining data with different formats onto a similar format or platform
- **Application:** consolidating servers or storage systems supporting different types of workloads onto fewer or larger systems
- **Storage:** consolidating storage onto fewer or larger storage systems independent of server type, OS, or application

The hottest topic of discussion among IT professionals is application consolidation. Application consolidation brings benefits through two different approaches, heterogeneous consolidation and homogeneous consolidation.

Heterogeneous application consolidation combines several different application types on the same server.

Homogeneous application consolidation combines several instances of the same application on a single server.

Both heterogeneous and homogeneous application consolidation can result in a reduction in the number of servers required to run applications and maintain the IT infrastructure.

Customer perception

While IT consolidation is well defined, the way in which most IT professionals perceive what IT consolidation accomplishes varies widely. Among the most common perceptions and beliefs are that IT consolidation is a:

- Reduction of the number of servers in your IT environment (saves on per server maintenance costs)
- Reduction of the data center footprint, or reduction in data center space (extends the life of the existing data center; avoids the cost of building a new data center; drives up the ratio of computer power per square foot)
- Reduction in Total Cost of Ownership (TCO) for the IT environment (increases the number of servers, or ratio, a technician can easily manage)
- Way to reduce operating costs and avoid new costs (electrical, HVAC)
- Way to simplify the IT environment (manage group of servers; fearlessly and confidently manage remote servers)

As part of IT consolidation, server consolidation is all of the above and, in some instances, more. While a server consolidation initiative might reduce the number of servers in your environment, it is also likely that the scalability of the server environment will be greatly increased allowing you to put resources to use exactly when and where needed. Utilization rates in the Intel space have been overlooked for years and can be dramatically increased. By reducing the data center footprint, you can simplify the environment, while most new servers will operate while providing the same, if not more, processing power. All of these topics will be discussed in greater detail later in the paper, starting with consolidation considerations.

¹IDC is the world's leading provider of technology intelligence, industry analysis, market data, and strategic and tactical guidance to builders, providers, and users of information technology. Visit www.idc.com for more information.

Most server consolidation efforts contain elements of the above discussed topics. The burgeoning questions for IT decision makers are whether the investment for a server consolidation initiative is justified, and if so, what kind of consolidation is right for my organization?

You can make the right decision for your organization by considering two important factors:

- What business drivers are leading the organization to consider server consolidation?
- What are the business objectives of a server consolidation initiative?

Investigating the driving factors and the business objectives will help you determine if your IT environment is a candidate for server consolidation.

Business drivers

What is driving your request for server consolidation? The business drivers could be financial, operational, or strategic.

Financial

One of the most common business drivers for server consolidation is growth in the number of servers in the IT environment. Many IT departments are faced with server growth upwards of 25% annually. Current economic conditions result in most IT departments not having appropriate funding to support this kind of growth.

Maybe your IT department pays another company to maintain the IT infrastructure. Coinciding with growth over the past few years, your server maintenance costs could be very high. You might also be surpassing break point levels in your service agreements and incurring additional PENALTY costs in order to support your server or storage needs.

The scaling back of corporate budgets is another factor to consider, as budgets are reduced as a result of the stagnant economy. Even if your IT department has not yet been affected, the prospect of finding ways to save money is always a challenge.

Operational

Your IT environment is affected by downtime and frustration at the end user level. The need for a fault-resilient solution and the technology to make it work, are key focus points for your business.

Through mergers and acquisitions, your IT department is now faced with integrating multiple operating systems, and supporting a much greater number of end users. In some instances, IT departments implement different applications on different platforms, making the environment very complex and sometimes redundant.

Strategic

Today's IT environment is much more competitive than in the past. Business units hold IT departments accountable for services provided and expect a good value combined with stable technology. Business units also explore the costs involved with outsourcing for their IT needs, which makes it even more important that your IT department has the scalability, reliability, and availability necessary to support business unit needs.

Server sprawl is an outcome of the past few years of building out the IT infrastructure, not to mention the common practice of deploying a new server every time a new application needs to be introduced. Servers can be physically spread out over many locations, resulting in a complex environment that may be difficult to manage. Server sprawl also leads to high costs of managing the IT infrastructure and low utilization numbers due to the size and scope of the environment. Server sprawl could be classified as a financial, technological, or strategic driver because there are elements of each that would be addressed by server consolidation. It is a strategic decision to deal with server sprawl sooner rather than later to reduce the complexity of your IT infrastructure.

In today's IT environment, businesses need to be agile and operate on a new barometer of cost effectiveness. Simply put, it might be your responsibility to find a way to do more with less and not compromise availability and functionality.

Business objectives

Once you establish that your IT environment is a candidate for server consolidation, the next step is to take a look at what the outcome of the initiative will be and how your "end-state" environment will look. Business objectives should be evaluated in the same terms as business drivers: financial, operational, and strategic.

Financial

Cost savings is the first potential benefit since economic justification is necessary to help build a case for implementing server consolidation. The easiest way to look at cost savings is through two categories – cost avoidance and cost reduction. Your objective might be to reduce operating expenses, cost per server, or avoid costs such as power consumption costs, purchasing new equipment, Service Level Agreements (SLA), outsourcing costs to maintain your infrastructure, or costs from additional data center space.

Operational

Improved availability and functionality can also be a result of a successful consolidation initiative. If your infrastructure is frequently faced with downtime challenges, end users will have a hard time being productive. One of the objectives of the consolidation effort might be to obtain the best possible availability for end users. In other words, you want your IT environment to achieve or approach "five nines" or 99.999% uptime.

Your IT environment consists of servers in four different locations and four different sets of engineers to maintain the platforms. Streamlining your infrastructure would be a top priority and primary business objective. Not only would you reduce the costs associated with managing your IT infrastructure, but you would also benefit from having a less complex infrastructure.

Another consolidation objective might be to move towards one platform for all of your IT needs. This would reduce compatibility issues and also make for a much less complex infrastructure.

Strategic

If your servers all are running one application with utilization numbers hovering around 10%, the primary objective of a server consolidation initiative would be to help improve resource utilization. A successful consolidation initiative would allow you to allocate resources more efficiently and easily introduce new hardware and software into your IT environment.

A combination of financial, operational, and strategic objectives will allow you to focus your server consolidation on the key areas of impact for your entire organization. The right combination of hardware, software, and services can help you achieve improved service levels while ensuring the efficiency, scalability, flexibility, and security at the infrastructure core. Your IT environment will be positioned better to optimize today's business assets for tomorrow's needs.

Consolidation considerations

A successful server consolidation initiative entails much more than just retiring old servers and using newer, bigger, more powerful servers to handle compute needs. In order to drive quantifiable business results such as lower costs, improved service levels, and enhanced business flexibility, it is imperative to consider three key aspects of a successful server consolidation initiative: performing the analysis that determines whether your IT environment is a candidate for server consolidation, streamlining the infrastructure, and maximizing resources.

Performing an analysis for server consolidation candidacy

One of the most important aspects of server consolidation takes place long before implementing a solution. It is impossible to implement a cost-effective, appropriate solution without performing an in-depth analysis of your current IT environment. The current server architecture should be accounted for. Inventory should be taken of all the server hardware, including storage, if applicable. Operating systems should be accounted for, because it is not uncommon to have different operating systems running various applications in an IT environment. Other factors to consider include the number of engineers needed to maintain the network, how many users it supports, and future manpower considerations.

Introducing AOG

A highly useful analysis can be performed via a partner of HP, named Asset Optimization Group, Inc. (AOG). AOG provides businesses with CapacityPlanner™ to understand what capacity they have, how it can be optimized, and how much more to purchase.

Downloadable, agent-less, and web-based, the software installs on a single machine and unobtrusively collects, in hours, detailed inventory of server and desktop components including processors, memory, applications, and services. The software combines the inventory data with corresponding performance measurements to determine peak loads and make server consolidation recommendations. AOG goes beyond server consolidation by comparing the customer's data against industry benchmark data and anomaly reports for server benchmarking, rapid problem resolution, and ongoing performance improvement.

IT consolidation opportunities

AOG products provide a fast, unobtrusive method for engaging customers in IT consolidation projects for Windows-based technology. The data generated from the inventory and performance reports will support discussions on consolidating data centers logically and cost-effectively using HP ProLiant technology. Key benefits to the customers include lower total cost of ownership, higher return on investment and improved business agility.

Data gathered can be used with the IT Consolidation Journey framework to help customers recognize how and where to begin consolidation projects, including how to measure success. More information on how to use this consolidation framework is located on the HP.com website.

After the IT environment is analyzed, the team responsible for the analysis will present conclusions and recommendations based on all factors involved. The recommendations will detail how your improved IT environment will look after consolidation. The reduction of the number of various types of servers will be detailed. All of the elements of your target consolidated environment should be described in great detail. Suggestions should be made on server retirement and servers that need to be refreshed. Software that can help improve service levels and utilization numbers will be detailed in terms of how and why. Most importantly, all of the financial numbers associated with a server consolidation will be stated. The investment outlay for your IT department, as well as cost savings, staffing cost improvements payback, and TCO reductions. For a more in-depth look at server consolidation financials, please read the "Consolidation economic" section of this paper.

While HP is the number one provider of industry-standard servers worldwide², HP understands that consolidation is about much more than hardware. HP offers everything you need to consolidate, from consulting and services expertise, to blade and enterprise servers, manageability tools, clustering expertise, and optimized software solutions. The HP approach to server consolidation is like no other—flexible, collaborative, and focused customer needs. To contact HP Services to conduct an Assessment Workshop, call 1-800-282-6672 or visit www.hp.com/hps.

² Source: Server and storage consolidation study, IDC 2002. Compaq (now HP) voted #1 in the server and storage consolidation study, IDC 2002.

Streamlining the infrastructure

An important element of server consolidation is the possibility of streamlining the IT infrastructure. Streamlining the infrastructure allows for better management of the IT environment, improved service levels, cost savings, and business agility. How is streamlining the infrastructure possible? The answer is through a consolidated environment's reduced complexity made possible by a better operating system, more efficient hardware, and enhanced software.

Centralization

Centralizing the data center into one location, if there are servers located in more than one location, is a great first step to take in order to streamline your IT infrastructure. This action would reduce any confusion involved with keeping track of servers. Centralizing your data center also allows for easier management and security because the entire IT infrastructure can always be easily accounted for and maintained.

Remote management

If centralization of the data center is not possible, you can centralize management of the IT environment. Utilizing remote management tools can drastically reduce the amount of time it takes to manage the IT environment, without any decrease in service levels or availability. For example, Remote Insight Lights-Out Edition II allows for complete control of all ProLiant servers. One click access allows systems administrators to take full graphical control of ProLiant servers in remote locations or lights-out data centers underneath the operating system. In other words, you have the ability to fix or patch an operating system. Using a standard web browser or handheld device, IT professionals can perform functions, such as deployment, configuration, maintenance and troubleshooting. Remote management tools can establish an IT environment with virtualized centralization.

For more information on Remote Insight Lights-Out Edition II, visit the HP website:

www.hp.com/servers/riloe.

Reduction in operating systems

IT infrastructures commonly have a very complex mix of platforms supporting the IT environment. Finding multiple operating systems in an IT environment is not uncommon. Microsoft Windows NT, Unix, Linux, and other operating systems are all commonly found in IT environments with different operating systems supporting different applications. Microsoft Windows 2000 and Windows Server 2003 provide an alternative, allowing servers to run more than one application reliably on the same server. The technology to wrap applications is embedded in the operating system, so they do not step on each other when running on the same server.

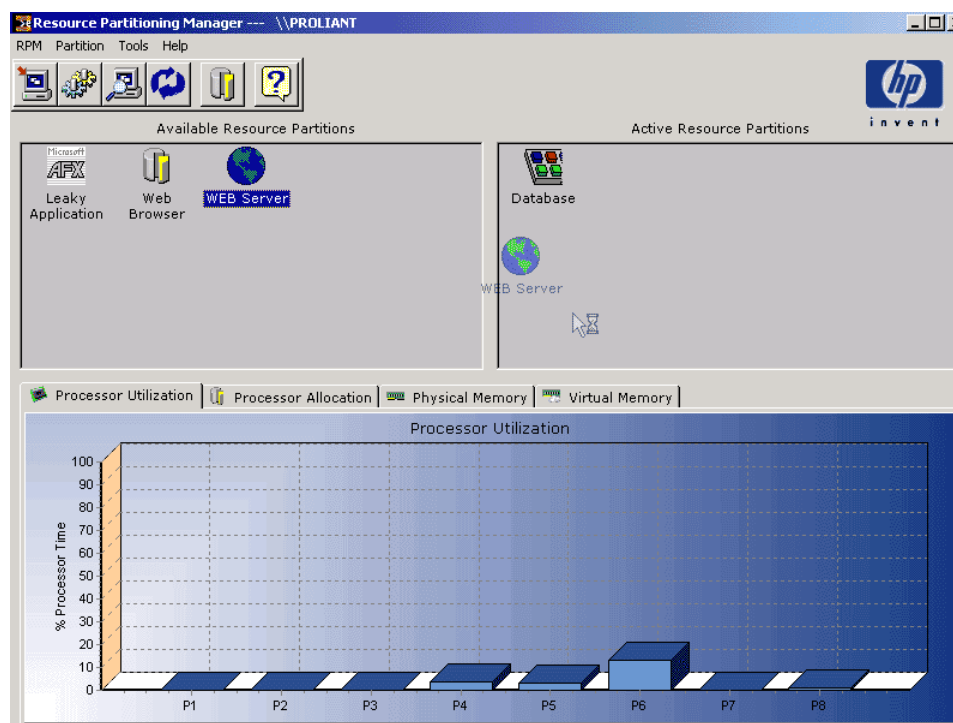
Partitioning software

Software options that use the enhanced scalability of the Windows 2000 operating system are available to help streamline the infrastructure. The ProLiant Essentials Workload Management Pack is a software solution that controls and dynamically allocates system resources enabling application consolidation and performance optimization on Windows 2000 and Windows Server 2003 server platforms. Some of the benefits are maximum utilization, lower total cost of ownership, and improved availability to IT environments.

For more information, visit www.hp.com/products/wmp.

IT managers can monitor processor utilization with ProLiant Essentials Workload Management Pack (see Figure 1).

Figure 1. Workload Management Pack graphical user interface (GUI)

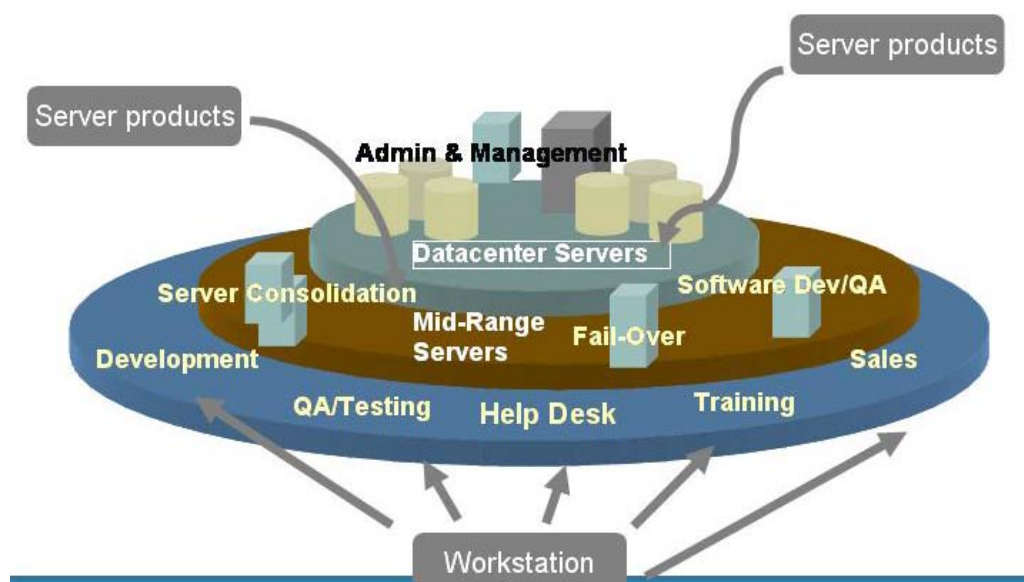


Virtual servers

Virtual machine technology can also simplify the server infrastructure of an IT environment. Virtual machines allow IT professionals to deploy new services efficiently, utilize server capacity fully, and manage compute resources strategically.

HP has partnered with VMware, the global leader of virtual machine software. VMware builds server software used for consolidating and partitioning physical servers in secure, virtual machines. Two products are available through HP Services: VMware GSX and VMware ESX. VMware GSX is enterprise-class virtual machine software for business-critical environments. VMware ESX is advanced enterprise-class virtual machine software consolidating and partitioning servers in the most demanding environments.

Figure 2. Server product boxes showing where VMware fits into an IT infrastructure



Rapid deployment

The ProLiant Essentials Rapid Deployment Pack is a product that automates the process of deploying and provisioning server software. New servers can be integrated into an existing environment in a fraction of the time it would normally take. Adding additional servers becomes a plug 'n' play task. Replacement servers can also assume the identity of a damaged server.

For more information on the ProLiant Essentials Rapid Deployment Pack, visit the HP website: www.hp.com/servers/rdp.

ProLiant Essentials Performance Management Pack

ProLiant Essentials performance management Pack (PMP) 3.0 is an integrated performance management solution that detects and analyzes hardware bottlenecks on HP ProLiant servers and MSA500/MSA1000 shared storage devices. PMP analyzes performance information to determine if there is a building or existing performance bottleneck issue. You can interactively display this information, log the information to a database for later analysis or reporting, and set up proactive notification using the HP Systems Insight Manager notification mechanism.

The performance data collected by PMP can be used to identify servers running workloads that are "complimentary" to one another with respect to which server subsystems are taxed and which are not. Thus, a very systematic approach can be taken to decide how to start down a consolidation path. Once workloads are consolidated, PMP can be used to monitor the server to assure that the assumptions made about the capabilities of the consolidation server were indeed correct.

Storage

The type of storage used in your IT environment can help reduce the complexity of an infrastructure. Data growth and storage needs can be costly and unpredictable. Many server consolidation initiatives include a storage solution improving the SAN or NAS in an IT environment. Storage in your current IT environment would be accounted for during the analysis stage of any server consolidation initiative you choose to explore.

In many ways, SAN technology is the enabler in regards to server consolidation and a streamlined IT infrastructure. To achieve an optimal IT environment, you must take control of your storage availability, performance, and utilization.

HP storage solutions offer scalable, easy-to-manage hardware, software, and services that help you optimize resources, reduce operating costs, simplify system management, and allow for future growth. The benefits of a storage solution include, but are not limited to:

- Reduced labor costs spent on management and maintenance requirements, as well as downtime and administration;
- Accelerated application deployment and increased storage efficiency;
- Centralized management, allowing administrators to handle ten times what they can today while proactively resolving potential problems;
- Cost-effective wide-area clustering and replication solutions;
- Achieving the highest level of data integrity with zero-downtime, and zero-recovery time;
- Consolidated multiple direct-attached storage devices into a pool of networked storage, enabling increased disk capacity utilization, added flexibility, and rapid capacity provisioning;
- Achieving a greater rate of return on investment, both people and systems, and do more with less.

For more information on storage consolidation, please visit the storage solutions page on the HP website:

<http://h30046.www3.hp.com/solutions/solutiondetail.php?topiccode=INFRASTORAGEDETAIL®ioncode=NA&langcode=USENG>.

More efficient hardware

Introducing newer, more efficient server hardware into the IT environment gives IT professionals an easy way to streamline the infrastructure. Blade servers are designed for space constrained IT environments. Compared to average servers, blades take up 80% less space and consume 40% less power, without losing any processing power. High-end servers with more processing power and multiple processors are also available such as the ProLiant DL580 and DL585 servers, 4-way servers, and the ProLiant DL760, an 8-way server. Bigger servers with multiple processing capabilities are ideal for messaging, scalable applications and databases.

For information on ProLiant servers, visit www.hp.com/go/proliant.

Figure 3. ProLiant servers well-suited for consolidation

ProLiant BL10e, a small blade server



ProLiant DL760, an 8-way enterprise



ProLiant BL20P, a flexible dual-processor blade server



ProLiant DL740, a 4u 8-way enterprise server



ProLiant BL40P, a 4-way blade server ideal for mission critical back-end applications



ProLiant DL560, a 2u 4-way enterprise server



Maximizing resources

The benefits of streamlining an IT infrastructure, along with other various financial, operational, and strategic benefits, often assume the focus of a company's server consolidation initiative. However, there are technological benefits that need to be considered. What very likely may be the key benefit of a successful server consolidation is the power it gives an IT department for maximizing their compute resources. In the past, when budgets were not a concern and the technology did not allow for better utilization, there were no alternatives to an underutilized IT environment. Maximizing compute resources allows for huge cost avoidance and reduction in operational resources.

In most organizations, economic conditions and budget constraints do not support the deployment of one or more new servers for every new application. These limitations create a challenge for most IT professionals who have to determine how to use their compute resources best while not compromising service levels and availability at the end user level.

New technology featuring more powerful hardware and more efficient software driven by a more reliable, capable, and scalable operating system, now gives IT departments a way to improve their utilization numbers. Most IT department's utilization numbers hover in the 10 to 20% range. However, it is not uncommon to find IT departments with utilization numbers in the high single digits. Regardless of where your utilization numbers reside, there is a significant amount of untapped compute resources in your IT environment.

Using the Windows Server 2003 operating system as the measuring scale, we know that the break point for putting the IT environment in jeopardy would be 80% utilization. If 80% utilization creates an unstable environment, there is no reason why an IT department should not strive for 60% utilization. Even using the high end of the scale for average environments, there is room for significant improvement in utilizing untapped resources. Just increasing utilization to 40% would, in theory, cut the total server count in half.

A major concern for IT professionals when scaling their systems to address specific needs is whether applications will work well together on the same server. Even though running applications on the same server was not a “best practice” in the past, IT professionals now want to know what it takes to make applications work well together on the same server, similar to mainframe processing capabilities.

Consolidation economics

As stated in the introduction of this paper, IT departments are often unable to implement a server consolidation effort without showing economic justification first. While a server consolidation effort provides IT departments many operational and strategic advantages, often the most important aspect of a successful consolidation is the financial value. Server consolidation discussions usually include Total Cost of Ownership (TCO), payback (in terms of months), and Return On Investment (ROI). Later in this section, TCO, payback, and ROI will be discussed in greater detail.

Cost savings

It is important to first review some of the very basic cost savings that can be realized through a server consolidation initiative.

Power consumption

A very basic cost reduction can be realized from savings in power costs. Having a smaller number of servers of the same technology will use less power. Deploying power-efficient servers into your environment can lead to even less power usage and lower power costs.

Increased server to engineer ratio

Staffing costs are another area where cost reduction and cost avoidance can be realized. A streamlined infrastructure leads to a reduction in the amount of time it takes to manage the IT environment. Therefore, it would allow the same amount of people more time to manage the larger infrastructure. By decreasing the administrative time for your IT environment, you also avoid having to hire more IT staff to manage the infrastructure. The number of servers per engineer can vary, leading to staff resource savings.

Service level agreements and server licenses

Service Level Agreements (SLA) and server licenses are other areas where significant cost savings can be realized. If your IT department pays another company to maintain a certain amount of servers and you reduce the number of servers needed, your costs are immediately reduced. In terms of server licenses, if you reduce the number of servers that software you purchase is licensed for, your expenditures will be lower due to the reduction of the number of servers.

Real estate

For some companies, data center space is not an issue. However, the majority of corporations have a limited amount of physical real estate for their IT environment. If your data center footprint is reduced through consolidation, real estate may be freed up for other business purposes or cost avoidance for data center space.

Idle resources

Low utilization numbers are common place in IT environments, but there is cost of underutilized resources. Typically, you can double utilization numbers using half the compute resources.

Total cost of ownership

Total Cost of Ownership (TCO) is calculated using all costs involved with an IT department. The costs used to determine TCO are depreciation, maintenance, staff, real estate used for the environment and planned renewals. Server consolidation initiatives frequently result in a significant decrease in TCO in both hard and soft costs.

Payback

Payback is the amount of time it takes organizations to recover their initial investment. It is widely recognized that 12 to 24 months is the average payback in terms of server consolidation initiatives. In other words, if your organization spent USD \$2 million dollars on a server consolidation initiative and realized a cost savings average of USD \$160,000/month your payback would be 12.5 months. Most customers are looking for payback within 6 to 12 months.

Return on investment

Another critical factor in justifying the expense of a server consolidation is the return on investment (ROI). While the cost of the server consolidation initiative will be relatively easy to figure out, calculating the true return on investment can be tricky because so many different aspects of the IT environment are impacted. ROI should be measured using many different calculation factors, such as TCO reduction, manpower costs, server costs, cost avoidance. ROI can be defined as the ratio of the cost of implementing a project, product, or service and the savings as a result of completing the activity in terms of internal savings, external revenue, or a combination of the two.

Economics versus technology

While every company wants to save money in terms of IT overhead, IT departments must use proven technology to maintain the environment. Even more important is the challenge of managing a growing infrastructure without increasing costs. The Microsoft Windows 2000 operating system provides a technology that is widely accepted and reliable. The benefits of scalability and the opportunity to allocate server resources help IT departments increase service levels and availability. This technology also allows for improved utilization of available compute resources while driving costs down.

The technology that is available to IT departments today makes it possible to reduce the complexity of the infrastructure, while not compromising service levels and availability. Using the available information technology and consolidating an IT environment allows IT professionals to drive quantifiable business results and greatly improve the business economics of maintaining a productive IT environment.

In today's constrained economic environment, many IT departments are faced with financial concerns being the primary factor driving the consideration of a server consolidation initiative. Many IT departments do not have the funding to support server growth. In order to justify server consolidation to the CFO level and above, solid economic numbers are needed. ROI, payback, and IRR (Internal Rate of Return) numbers can be provided and detailed by a services engagement with a third party company, usually the same company that conducts the analysis of your current IT environment.

HP Services can help build an economic justification for implementing server consolidation initiatives using tools that detail the important financial information needed for CFO approval.

Learn more about ProLiant IT consolidation at www.hp.com/servers/proliant/consolidation.

To contact HP Services for an engagement to help build economic justification for server consolidation, call 1-800-282-6672.

Common customer scenarios

In order to be more relevant to your everyday business needs, it is essential to examine some common customer scenarios to see how the discussed topics play a role in IT consolidation. In this section, we will explore some of the consolidation needs and potential benefits for customers that initiated a server consolidation effort with the help of HP.

Providing in-house IT services

In today's ultra-competitive IT marketplace, many corporate in-house IT providers are challenged with positioning themselves as the primary IT provider to business units. In-house IT providers are striving to lower long-term TCO, while providing cost-effective, high-value alternatives to external IT vendors. This drives the need for a solid, scalable, highly available foundation capable of supporting the demands of various business units.

In situations like this, it is common for IT environments to have experienced explosive growth and dramatic change over the course of a few years. This evolution is usually marked by growth in business and mission-critical applications, increased server and storage needs, diminishing data center space, and the expansion of engineering and support resources. Taking all of these factors into consideration, in-house IT providers usually try to find a way to leverage existing and future hardware and platform technology in order to lower long-term TCO and become strategically positioned as the primary IT provider.

HP's vision for this type of situation is to help in-house IT providers create an adaptive infrastructure – starting with the upgrade to Windows 2000, then building on the platform using blade servers to reduce space without compromising processing power, high-end 8-way servers for mission critical applications, and ProLiant software for remote management and dynamic resource allocation. The end result is a fault-resilient IT environment that allows in-house IT providers to accurately predict, prevent, diagnose, and rapidly respond to potential and actual fault conditions. The consolidated infrastructure will benefit from better resource utilization and improved management, all while reducing TCO and avoiding costs, making a server consolidation initiative a valuable investment.

Outsourcing costs

Many companies pay an external IT provider to support a specific number of servers in order to maintain their IT environment. The downside of this strategy is that once a specific breakpoint is bypassed, additional costs are incurred. This presents a challenge because as business grows, so do the needs of an IT environment. Due to budget constraints, many companies must find a way to realize immediate cost savings without losing productivity. This drives the need for a scalable IT infrastructure.

Historically, companies that outsource their IT infrastructure deployed a single server dedicated to a specific application. This practice translated into an increasingly high cost for support and management of these servers. This also translates into a complex support environment for the appropriate service levels required.

Typically, companies in this situation choose to run a pilot program, called a proof of concept, before initiating consolidation across the entire IT infrastructure. This pilot program usually focuses on consolidating applications from a one application-to-one server platform to a multiple applications-to-one server environment. The most important aspect of this proof of concept is to learn how to reduce the number of servers by partitioning compute resources. Hardware, such as the DL580G2 4-way server and the DL760 8-way server, using the ProLiant Essentials Workload Management Pack

software to partition compute resources often dramatically reduce the number of servers needed to run applications as a result of better compute resource utilization. Running a pilot before implementing a server consolidation initiative allows companies to determine what impact server consolidation will have on the entire IT environment, and determine if the economic benefits are justifiable. The proof of concept also shows what applications and servers can and cannot be consolidated, helping to avoid downtime and maintain service levels as server consolidation is implemented on a wider scale across the entire IT environment.

Server consolidation pilot programs show companies that outsource their IT needs the benefits of implementing server consolidation on a wider scale. The cost savings that can be realized from reducing the amount of servers resulting in maintenance cost reductions, and a reduction in the cost of managing the applications are usually what drives companies that outsource their IT needs to implement a server consolidation initiative.

Supporting mission-critical applications

Being able to provide cost-effective support for mission-critical applications is a constant challenge for most IT departments, especially in the healthcare industry, where many non-profits have to be careful that each expenditure is justified while providing the best possible patient care. Many healthcare organizations have seen their IT environment grow over the past four years and are faced with numerous servers to support applications, sometimes spread out over more than one data center. This drives the need for a reduction in the number of servers and reduced complexity in the IT infrastructure, all while maintaining a robust, fault-resilient infrastructure operating on a 24/7 basis.

Using hardware, such as the ProLiant DL380 2-way and DL580 4-way server, to power departmental applications and web applications provide a way to reduce server count while ensuring scalability and reliability. Even more powerful and scalable, the ProLiant DL760 8-way servers can run PeopleSoft applications – consisting of financial, human resources, and payroll modules with correlating Oracle databases. HP ProLiant Essentials Rapid Deployment Pack for new server provisioning and configuration makes it possible to install many servers rapidly and reliably. This software automates the generation of standard server configuration scripts. HP Insight Manager and HP Remote Insight Lights-Out Edition can be used to manage ProLiant servers centrally through a graphic remote console, helping reduce the complexity of having more than one data center.

Through server consolidation it is possible to reduce the number of servers in data centers, sometimes by 40%, which will conserve data center space, save on software license fees, and centralize management of mission-critical applications. HP ProLiant servers, HP software, and HP StorageWorks SAN help reduce the cost, complexity and manageability of the data center. The end result of a successful server consolidation can be an always-on, fault tolerant HP infrastructure. In the healthcare industry, this is the only acceptable IT environment.

Reducing Microsoft based IT costs and lowering capital expenditures

Companies with a vast IT infrastructure consisting of thousands of servers have to look at innovative ways to keep costs down without compromising service levels. Return on investment is imperative, and IT infrastructures of this size must be sure that starting now is the most cost-effective route to take. Large IT infrastructures must streamline the infrastructure to get the most out of their compute resources.

In this situation, several HP servers and software solutions can be utilized. HP ProLiant Essentials Rapid Deployment Pack can be used to deploy and automatically configure blade servers for web applications. HP ProLiant DL580 4-way and DL760 8-way servers can be used to consolidate high end messaging, applications and databases. HP Resource Partitioning Manager (RPM) can be used on high-end 4-way and 8-way servers to partition and dynamically allocate resources, resulting in better utilization of compute resources. This software allows IT departments to put idle server resources to work. Storage virtualization can help simplify management, while increasing scalability and availability.

The dynamic allocation of resources, streamlined processes and procedures, and a better-utilized IT environment can be the end result of a server consolidation initiative for corporations with a large IT infrastructure. Less real estate would be required for the server population and fewer resources would be needed to manage the server infrastructure. Cost savings would be realized from fewer application licenses and server licenses. Overall, the investment in compute resources can be maximized as a result of a successful server consolidation initiative.

Conclusion

While the needs for server consolidation remain consistent, no two server consolidation initiatives are exactly alike. The four server consolidation initiatives reviewed in this paper all had different business drivers and objectives. While the symptoms can vary from one IT environment to another, the result of a server consolidation initiative will always be the same – a less complex infrastructure that is easier to manage with better utilized compute resources. In other words, IT professionals can achieve the financial, operational, and strategic benefits they are looking for. Moreover, when you are prepared to determine the exact business needs driving your consolidation initiative, you benefit from leveraging today's assets for tomorrow's business needs. IT and business can be linked like never before and server consolidation is what makes it possible.

For more information

Product information: 1-800-345-1518

Pre-sales: 1-800-282-6672

Post-sales: 1-800-652-6672

Business Partner sales consulting: 1-800-888-5874

For additional information, refer to the resources detailed below.

Table 1. Web resources

Resource description	Website address
ProLiant servers	www.hp.com/go/proliant
ProLiant IT consolidation	www.hp.com/servers/proliant/consolidation
HP Insight Management Suite	www.hp.com/servers/manage
HP ActiveAnswers	www.hp.com/solutions/activeanswers
Asset Optimization Group, Inc.	www.aogtech.com
Program marketing manager	kathleen.moore@hp.com or stan.grant@hp.com

Call to action

To help us better understand and meet your needs for ISS technology information, please send comments about this paper to: TechCom@HP.com.

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